

Applicant : Cihla
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Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Current amended) A method of controlling data flow to reduce congestion in a server having

a plurality of ports including a plurality of ingress ports and a plurality of egress ports, comprising the steps of:

detecting first congestion in a first data flow through a first component of said server, wherein said first component is coupled to one of said plurality of ports; controlling said first data flow through said first component in response to said first congestion;

sending a first signal from said first component to a second component of said server in response to said first congestion; and

controlling a second data flow through said second component in response to said first signal;

detecting second congestion in said second data flow by said second
component;
sending a second signal from said second component in response to said
second congestion; and
controlling a third data flow through said third component in response to said
second signal by communicating through an out-of-band signal to an opposite second
component carrying data flow contributing to said third congestion wherein the out-
of-band signal instructs the opposite second component to control the corresponding
data flow associated with said opposite second component.

2. (Cancelled)

3. (Currently Amended) An apparatus including a server for reducing data flow congestion when processing data between a plurality of devices connected via a network, said server comprising:

a plurality of ports configured for ingress and egress of a plurality of data

frames having a first format;

a plurality of port manager processors, coupled to said plurality of ingress ports and said plurality of egress ports, said plurality of port manager processors being configured to translate said plurality of data frames between said first format and a second format, said plurality of port manager processors being further configured to detect first congestion and to control a first data flow of said plurality of data frames when said first congestion is detected;

a plurality of traffic manager processors, coupled to said plurality of port manager processors, said plurality of traffic manager processors being configured to communicate said plurality of data frames with associated ones of said plurality of port manager processors, said plurality of traffic manager processors being further configured to detect second congestion and to control a second data flow of said plurality of data frames when said second congestion is detected; and

a plurality of storage processors coupled together and coupled to said plurality of traffic manager processors, said plurality of storage processors being configured to direct said plurality of data frames according to an associated ingress port and an

associated egress port of said plurality of ports, said plurality of storage processors being further configured to detect third congestion and to control a third data flow of said plurality of data frames when said third congestion is detected by communicating through an out-of-band signal to an opposite traffic manager processor carrying data flow contributing to said third congestion wherein the out-of-band signal instructs the opposite traffic manager to control the corresponding data flow associated with said opposite traffic manager.

4. (Original) The apparatus of claim 3, wherein said network comprises a Fibre Channel network.

5. (Original) The apparatus of claim 3, wherein said first format comprises a Fibre Channel format.

6. (Original) The apparatus of claim 3, wherein said plurality of ports comprises eight Fibre Channel ports, said plurality of port manager processors comprises four port manager processors, said plurality of traffic manager processors comprises two

traffic manager processors, and said plurality of storage processors comprises two storage processors.

7. (Original) The apparatus of claim 3, wherein said second format comprises a Packet Over Synchronous Optical Network (SONET) (POS) format.

8. (Original) The apparatus of claim 3, wherein one of said plurality of data frames travels in an ingress direction via one of said plurality of ports, then via one of said plurality of port manager processors, then via one of said traffic manager processors, then via one of said plurality of storage processors.

9. (Original) The apparatus of claim 3, wherein one of said plurality of data frames travels in an egress direction via one of said plurality of storage processors, then via one of said traffic manager processors, then via one of said plurality of port manager processors, then via one of said plurality of ports.

10. (Original) The apparatus of claim 3, wherein said first congestion comprises ingress congestion, wherein one of said plurality of port manager processors detects said ingress congestion via a signal from an associated one of said plurality of traffic manager processors, and wherein said one of said plurality of port manager processors controls said first data flow by buffering packets of said plurality of data frames.

11. (Original) The apparatus of claim 3, wherein said first congestion comprises egress congestion, wherein one of said plurality of port manager processors sends a signal to an associated one of said plurality of traffic manager processors, and wherein said associated one of said plurality of traffic manager processors controls said second data flow in response to said signal.

12. (Original) The apparatus of claim 3, further comprising:

a plurality of buffers, coupled to said plurality of traffic manager processors, configured to buffer one or more of said plurality of data frames when said second

congestion is detected.

13. (Original) The apparatus of claim 3, wherein said second congestion comprises ingress congestion, wherein one of said plurality of traffic manager processors sends a signal to an associated one of said plurality of port manager processors, and wherein said associated one of said plurality of port manager processors controls said first data flow in response to said signal.

14. (Original) The apparatus of claim 3, wherein said second congestion comprises egress congestion, wherein one of said plurality of traffic manager processors sends a signal to an associated one of said plurality of storage processors, and wherein said associated one of said plurality of storage processors controls said third data flow in response to said signal.

15. (Original) The apparatus of claim 3, wherein one of said plurality of traffic manager processors sends a queue status message to an associated one of said

plurality of storage processors, and said associated one of said plurality of storage processors controls said third data flow in response to said queue status message.

16. (Original) The apparatus of claim 3, wherein said third congestion comprises ingress congestion, wherein one of said plurality of storage processors sends a first signal to an associated one of said plurality of traffic manager processors, wherein said associated one of said plurality of traffic manager processors controls said second data flow in response to said first signal and sends a second signal to an associated one of said plurality of port manager processors, and wherein said associated one of said plurality of port manager processors controls said first data flow in response to said second signal.

17. (Original) The apparatus of claim 3, wherein said third congestion comprises egress congestion, wherein a first one of said plurality of storage processors sends a signal to a second one of said plurality of storage processors, and wherein said second one of said plurality of storage processors controls said third data flow in

response to said signal.

18. (Original) The apparatus of claim 3, wherein one of said plurality of storage processors includes:

an egress buffer configured to buffer one or more of said plurality of data frames when said third congestion, corresponding to egress congestion, is detected.

19. (Original) The apparatus of claim 3, wherein one of said plurality of storage processors includes:

an ingress buffer configured to buffer one or more of said plurality of data frames when said third congestion, corresponding to ingress congestion, is detected.

20. (Original) The apparatus of claim 3, wherein one of said plurality of storage processors executes a computer program that controls said one of said plurality of storage processors to control said third data flow and to send congestion information to another of said plurality of storage processors.

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